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Materiel Test Procedure 4-3-041  
U. S. Army Armor and Engineer BoardU. S. ARMY TEST AND EVALUATION COMMAND  
COMMODITY SERVICE TEST PROCEDURE

## CARTRIDGE CASES

1. OBJECTIVE

The objective of this MTP is to describe the testing techniques required to evaluate the suitability of cartridge cases as a component of complete ammunition rounds for use as specified in Small Development Requirements (SDR), Qualitative Materiel Requirements (QMR), or other approved applicable criteria.

2. BACKGROUND

This Materiel Test Procedure applies to the testing of cartridge cases as an integral part of complete rounds for various classes and caliber of armament.

A cartridge case is the component of ammunition that contains the propelling charge with the assembled primer or ignition system. The cartridge case also acts as an obturator for the propelling charge when the complete round is inserted into the chamber of an artillery class cannon, automatic weapon, small arm or other closed-breech gun or launcher type device.

Cartridge cases are classified according to the material from which they are fabricated. The principal materials are brass and steel. Aluminum is used in certain low pressure applications. Additional classifications of cartridge cases include multipiece plastic, combustible and consumable.

3. REQUIRED EQUIPMENT

- a. Camera and Film
- b. Magnifying Glass
- c. Micrometer Caliper
- d. Weighing Scale
- e. Tape Measure
- f. Guns and Ammunition, as required for applicable test
- g. Suitable Ranges as required

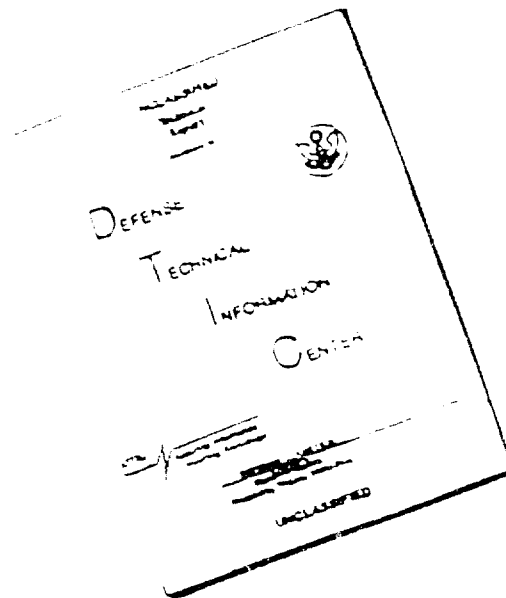
4. REFERENCES

- A. AR 385-63, Safety Regulations for Firing Ammunition for Training, Target Practice, and Combat.
- B. USATECOM REG 385-6, Verification of Safety of Material During Testing.
- C. Post (or test site) Range Regulations and SOP's.
- D. TM 9-1300-206, Care, Handling, Preservation and Destruction of Ammunition.
- E. MTP 4-3-501, Personnel Training.
- F. MTP 4-3-506, Adverse Conditions.

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- G. MTP 4-3-511, Transportability (Ammunition).
- H. MTP 4-3-517, Combat Vehicle Ammunition Stowage and Transportability.
- I. MTP 4-3-520, Field Storage.

5. SCOPE

5.1 SUMMARY

This Materiel Test Procedure covers tests to be used in evaluating cartridge cases which are described as follows:

- a. Preparation for test - A determination of the condition of the test item and its shipping container upon arrival, test item physical characteristics and the availability of test ranges and adequately trained personnel.
- b. Firing Tests - An evaluation to determine whether the test item meets requirements when subjected to actual firing exercises.
- c. Adverse Conditions - An evaluation to determine the effect of adverse conditions on the use of the test item.
- d. Field Storage - An evaluation to determine the effect of long-term storage, under various conditions, on the test item.
- e. Combat Vehicle Stowage and Transportability - An evaluation to determine the effects of vehicle stowage and transport on the test item.

5.2 LIMITATIONS

The tests outlined in this Materiel Test Procedure are limited to cartridge cases and integral components.

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Personnel

a. Ensure that service personnel who will use the test item are adequately trained and are familiar with the following aspects:

- 1) Pertinent technical publications
- 2) Instructions and provisions of safety release
- 3) Assembling
- 4) Loading and firing

b. Record the following for all service personnel:

- 1) Name
- 2) Rank or grade
- 3) MOS
- 4) Training time in MOS
- 5) Experience in MOS

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### 6.1.2 Facilities and Equipment

The project officer will accomplish the following:

- a. Select and schedule the use of appropriate range or ranges as required by applicable test.
- b. Assure the availability of test item components in the proper quantities.
- c. Assure the availability of applicable weapons in good condition.
- d. Arrange for maintenance support facilities and equipment, and obtain the safety release from HQ USATECOM as prescribed by USATECOM REG 385-6 (reference 4B).

### 6.1.3 Arrival Inspection

#### 6.1.3.1 Shipping Container

- a. Visually inspect test item containers and record the following:

- 1) Type of container.
- 2) Evidence of damage or deterioration to the container.
- 3) Identification markings including:

- a) Nomenclature
- b) Test item lot number
- c) Name of manufacturer
- d) Date of manufacturer

- b. Photograph all evidence of damage and/or deterioration.

- c. Record special tools and/or equipment included with cartridge

cases.

#### 6.1.3.2 Cartridge Case

Select random samples of test items and visually inspect for the following:

NOTE: The sample size should be determined based on the confidence level required.

- a. Presence of erosion.
- b. Cracks, dents, and out-of-roundness of the cartridge case.
- c. Faulty crimping of projectile, where applicable.
- d. Set back primers.
- e. Short rounds.
- f. Burred or damaged cartridge rims or base flange.
- g. Indication of softness, peeling or break-up of protective coating.
- h. Indications of softness, or deterioration of combustible or consumable cartridge cases.
- i. Photograph all evidence of damage and/or defects.

6.1.4 Physical Characteristics

a. Compare the samples of paragraph 6.1.3.2 for conformity to the applicable drawings and physical specifications.

b. Record the following:

- 1) Weight
- 2) Dimensions
- 3) Size (mm)
- 4) Type
- 5) Type firing (single round or automatic)
- 6) Test item classification (brass, drawn steel, aluminum, plastic, combustible, or consumable)
- 7) Deviations from specifications

6.2 TEST CONDUCT

Tests shall be conducted concurrently with or in conjunction with other service firing tests whenever possible so that the time to collect the required data can be minimized.

6.2.1 Firing Tests

a. Conduct firing tests concurrently with other firing tests such as:

- 1) Applicable Projectile Tests
- 2) Accuracy and Precision (MTP 3-3-506)
- 3) Propellant, Ammunition (MTP 4-3-125)
- 4) Small Arms Marksmanship or Field Firing Exercises
- 5) Machine Gun Marksmanship Field Firing Exercises
- 6) Any other appropriate firing exercises

b. Observe and record the following during and after firing exercises:

- 1) Type of cartridge case.
- 2) Difficulties encountered in chambering the test item, if any.
- 3) Difficulties encountered in extracting/ejecting cartridge case, if any.
- 4) Serviceability of the base flange (rim).
- 5) Location, size, and description of structural failures, if any.
- 6) Case deformation, if any.
- 7) Extent of loading hole expansion, when applicable.
- 8) Dispersion or accuracy of fire data.
- 9) For consumable and combustible cartridge cases, evidence of inert, smoldering, or burning residue disclosed by inspection of the breech chamber upon completion of opening cycle.

6.2.2 Adverse Conditions

During the conduct of the test, determine the effect of adverse conditions on the test items as described in the applicable sections of MTP 4-3-506.

6.2.3 Field Storage

Determine the effects of field storage on the test item by performing the procedures as described in the applicable sections of MTP 4-3-520.

6.2.4 Combat Vehicle Stowage and Transportability

Determine the ability of the test items to withstand the shock and vibration of normal transport conditions without becoming defective while stowed in a combat vehicle of the appropriate type/model and during logistic support by performing the applicable procedures of MTP 4-3-517 and MTP 4-3-511.

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Personnel Training

Record the following:

a. Data collected as described in the applicable sections of MTP 4-3-501 and MTP 4-3-521.

b. For all personnel:

- 1) Name
- 2) Rank or grade
- 3) MOS
- 4) Training in MOS
- 5) Experience in MOS

6.3.1.2 Arrival Inspection

6.3.1.2.1 Shipping Container

a. Record the following:

- 1) Type of container
- 2) Damage to the container and/or the cartridge case
- 3) Identification markings including:
  - a) Nomenclature
  - b) Test item lot number
  - c) Name of manufacturer
  - d) Date of manufacture
- 4) Type of special tools and/or equipment received

b. Retain all photographs.

6.3.1.2.2 Cartridge Case

Record the following:

- a. Presence of erosion.
- b. Cracks, dents, and out-of-roundness of the cartridge case.
- c. Faulty crimping of projectile, where applicable.
- d. Set back primers.
- e. Short rounds.
- f. Burred or damaged cartridge rims or base flange.
- g. Indications of softness, peeling or break-up of protective coating.
- h. Indications of softness, or deterioration of combustible or consumable cartridge cases.

#### 6.3.1.3 Physical Characteristics

Record the following:

- a. Weight to nearest tenth of pound.
- b. Dimensions in inches.
- c. Size in mm.
- d. Type.
- e. Type firing (single round or automatic).
- f. Test item classification (brass, drawn steel, aluminum, plastic, combustible, or consumable).
- g. Deviations from specifications.

#### 6.3.2 Test Conduct

##### 6.3.2.1 Firing Tests

Record the following:

- a. Type of firing test (Accuracy and Precision, propellant, etc.).
- b. Type of cartridge case.
- c. Difficulties encountered in chambering the test item, if any.
- d. Difficulties encountered in extracting/ejecting cartridge case, if any.
- e. Serviceability of the base flange (rim).
- f. Location, size, and description of structural failures, if any.
- g. Case deformation, if any.
- h. Extent of loading hole expansion, when applicable.
- i. Dispersion or accuracy of fire data.
- j. For consumable and combustible cartridge cases evidence of inert, smoldering, or burning residue disclosed by inspection of the breech chamber upon completion of opening cycle.

##### 6.3.2.2 Adverse Conditions

Record data collected as described in the applicable sections of MTP 4-3-506.

6.3.2.3 Field Storage

Record data collected as described in the applicable sections of MTP 4-2-520.

6.3.2.4 Combat Vehicle Stowage and Transportability

Record data collected as described in the applicable sections of MTP 4-3-517 and MTP 4-3-511.

6.4 DATA REDUCTION AND PRESENTATION

All data obtained by inspection and testing described in this Material Test Procedure, including photographic coverage, will be suitably tabulated or otherwise arranged for correlation under the appropriate sub-test within the plan of test and presented in a manner to indicate whether the test item meets the SDR, QMR, or other applicable criteria.

A Safety Confirmation shall be presented in accordance with USATECOM Regulation 385-6.